

Hanes testified that he was aware that the product safety cables were to be utilized on trucks. Further, when asked if he would recommend this material if he knew the product had a 10-year life, Hanes testified:

A. I would - - would - - you know, based on that, a ten year life span would be pushing the window for galvanized.

Q. You - - you would say - - what do you mean, "pushing the window for galvanized"?

A. That's - - that's a long time for any type of galvanized product to be subject to salt, corrosion.

Q. And why's that?

A. It's the chemical process that happens, the galvanizing breaking down.

Hanes Pg. 70

Hanes testified that stainless steel would have been more corrosion resistant than galvanized, and that steel that was not galvanized would have accelerated the oxidation process. With regard to the safety cable failures, Hanes testified:

Q. Okay. Are you surprised that after five to six years on these trucks their cables started breaking?

A. I'm surprised if they were maintained properly and inspected, they would have been removed.

Q. Okay. So, you're saying that if they had been maintained and inspected, they should have been removed, correct?

A. Correct.

Hanes Pg.'s 71 & 72

Deposition Testimony of Peter J. Terzian, Jr.

Terzian testified that he was the General Manager of the entire manufacturing operation at CCI.

Terzian testified that prior to the incident design, CCI had utilized the safety cables on a truck that was built for a company in Belgium and that they provided hand holds for a Canadian design. Further, Terzian testified that there was a history of falls from the vehicles, but that there were not a lot from that position.

With regard to the use of the cables Terzian testified that "Mr. Fortuna asked us to evaluate them":

- Q. Okay. When he asked you to evaluate it, what did you do?
- A. Well, you know, I misstated that, because, really, he didn't ask us to evaluate it. He asked us to put them on so that he could evaluate it.

Terzian Pg. 27

With regards to the implementation of the safety cables, Terzian testified:

- Q. Did it come in stages? I mean, did he put ten on trucks and say, okay, that's a good idea, let's put them on them all, or did he just put them on them all and evaluate it from there?
- A. It's funny you mention that, because he and I had a bit of a - - an argument about that. He said put them on them all. And I, a student of cautious evolution, I learned in the past that you do things, test them, and then do them again and then do them again and test them and then make a decision. Mr. Fortuna said, no, in this particular case he wanted them put on. And so I said okay. He's the boss.

Terzian Pg. 38

Terzian testified that the only company that CCI purchased cables from was Hanes Supply Co. With regard to the strength of the cables Terzian testified that he recalled the cable as being 7,000-pound test:

... And we were talking about a driver no heavier than 350 pounds, I would imagine, ever. But, so, really, it was - - even if you double that to 700 pounds, it was ten times safer than we felt we needed. So, we took his recommendation because he was the expert and we put them on.

Terzian Pg. 30

Terzian testified that the use of the galvanized cable was based on the recommendations of Hanes because "He was the expert":

We asked his advice.

Terzian Pg. 35

And:

- Q. Okay. Was stainless steel considered at all?

- A. We just went by the recommendations that Mr. Hanes or Hanes Supply came up with, you know. Galvanized seems - - aircraft cable seems to us that if the aircraft industry relied on that type of cable to maintain the safety of hundreds of people for a long period of time, it certainly would be okay for what our intended purpose was.

Terzian Pg. 52

Terzian testified that the life of the auto transporter was 10 years. Further after that the vehicle would be brought in to be refurbished completely from "stem to stern".

Terzian testified that the drawing of the cable was generated four to five months after CCI implemented the design and began receiving cables.

With regard to the expected use of the cables Terzian testified:

- Q. Okay. The - - the cables were meant, though, for people to grab onto them?
- A. Yes, sir, they could - - they could grab onto them, and they were being evaluated to see if, in fact, a person did slip and fall, would they prevent a fall off the head ramp.
- Q. Was the evaluation ever done?
- A. No. It really wasn't. I had asked a couple of times over - - oh, Mr. Fortuna, in all fairness, Mr. Fortuna was only there for like two years.

Terzian Pg. 56

Terzian testified that he was not aware of any maintenance instructions being provided with regard to the cables.

Discussion

By design, it is necessary for users of an auto transporter, such as the incident unit, to climb up onto the vehicle for the purposes of loading. However, auto transporters should be properly designed so that operators are protected against the hazards of falling. This is foreseeable. Further, auto transporters should be properly designed so that operators are protected against the hazards of premature safety cable failures a known condition that can lead to a loss of balance and/or a fall. This too is foreseeable. Thus, the auto transporters and in particular, the safety cables, must be properly designed, maintained, and be unambiguous and be adequately defined for its user, Ferguson.

That the safety cable would cause a fall due to the failure that occurred would not have been apparent to Ferguson who is neither an engineer nor a designer. Further, that the safety cable could or would fail under the incident circumstances would not have been apparent to Ferguson who has not designed an auto transporter.

Allied systems had specific knowledge that safety cable failure incidents occurred prior to the Ferguson incident. Yet, the defective condition of the incident unit was not corrected, nor was a proper inspection done to detect the defective condition. This is improper. Had a proper inspection been done, and the defective condition detected and corrected, this incident would not have occurred. The incident vehicle did have three replacement safety cables; yet, the incident cable was not replaced. This is improper maintenance in particular considering an incident similar to the Ferguson incident occurred about a month prior.

Further, testimony revealed that Hanes and CCI had specific knowledge that vehicles and components they manufactured needed to be safe with regards to failures and that their safety cables were in fact being utilized in conjunction with highway vehicles with a ten year life. Terzian testified that he had never heard of a single safety cable failure yet Hanes testified that in about 1999 CCI changed their design to that similar to the configuration found on the other three safety cables of the incident unit. None of which were shown in a failed condition on the date the incident vehicle was first photographed.

No explanation has been provided as to why the design change was made. Further absent a defective condition there would have been no reason for CCI and/or Hanes to change the design. Finally, no drawing or change notice that reflects the change has been provided.

Thus, Hanes and CCI knew that there was at least a condition related to safety cable failure that could lead to an unexpected loss of balance and/or fall, yet provided no warning or instruction with regard to what the condition is and what to do in the event the condition is encountered.

Terzian a self proclaimed student of cautious evolution failed to follow his teachings. Further, neither did he nor CCI perform any testing or evaluation to determine the validity of their design. Rather, Terzian relied on the supposed recommendations of Hanes Supply and his belief that the cable was fit for his purpose if it was fit for use in an aircraft. Yet Unirop, a wire rope manufacturer, warns that the rope is unfit for aircraft use and Hanes claims to have provided no recommendations of any type in any form.

Hanes testified that it was CCI that provided the critical design and selection criterion, yet the drawing of the actual initial component was not completed until four to five months after the safety cables were in use.

Further Terzian claims that the safety cable had a factor of safety greater than 10 based on twice the weight of his expected driver. My analysis reveals that the abrupt transition between the safety cable and the swaged fitting produces a geometric stress concentration ⁽¹⁵⁾. Peterson writes ⁽¹⁵⁾:

The elementary formulas used in the design are based on members having a constant section or a section with gradual change of contour (Fig. 1). Such conditions, however, are hardly ever attained throughout the highly stressed region of actual machined parts or structural members. The presence of shoulders, grooves, holes, keyways, threads, and so on, result in a modification of simple stress distributions of Fig. 1, so that localized high stresses occur as shown in Fig. 2. This localization of high stresses is known as a stress concentration, measured by the stress concentration factor ...

Peterson's Figures 1 & 2 are shown in my figures 2 and 3.

My analysis reveals that the transition of the cable to fitting results in a stress concentration factor of about 4. This means that the actual strength of the safety cable was at least half as strong as Terzian believed. Further, this is assuming we have an undamaged, uncorroded cable. As stated above, either condition would further reduce the cable strength and will ultimately lead to a failure as occurred in this incident.

The warning Hanes supplies on its invoice is improper and inadequate. An invoice from a component manufacturer to a vehicle manufacturer is not intended to reach consumers. Further, invoices in general are passed on to the purchasing department of the vehicle manufacturer and not to individuals involved with product safety. Thus Hanes should not assume that anyone involved with product safety from CCI ever saw the warning. Even so, the invoice does not instruct or warn operators or users with regards to proper procedures in the event that corrosion is encountered. There is no warning or instruction with regards to what to expect and how to prevent corrosion.

CCI who manufactured the vehicle provided no manual, instruction or warning of its own making with regard to inspection or maintenance, nor did they correct the defective condition that Hanes created.

Allied did not maintain the trailer in accordance with the federal requirements. A proper maintenance program would have identified the rust on the incident safety cable. Further a proper maintenance program would have identified the presence of the incident safety cable when the other three had been replaced. Based on the vehicle's age, knowledge of the failure problem, and the presence of rust, proper procedure dictates that a complete investigation be completed to determine the condition of their safety cables including that of the incident vehicle. This investigation would include, at a minimum, the removal of all suspected cables and correspondence with the vehicle manufacturer for the purpose of design resolution.

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Answered

Allowing corrosion to accumulate in the joint demonstrates improper maintenance. Had proper inspections and maintenance been performed on the vehicle all corroded cables would have been removed and this incident would not have occurred. In light of the known failures, had Allied properly maintained the vehicle this incident would never have occurred.

Allied should have known that after failures began to occur that the cables needed to be properly inspected and maintained.

A proper record of all inspection and maintenance should have been kept by Allied, and was not. Further the failed components involved with this incident should have been preserved and were not.

The Maintenance practices of Allied were improper in that they were not in compliance with the Federal Regulations. Further, that the defective cable was present on the vehicle on the date of the incident when Weaver testified that all cables were to be replaced demonstrates that the proper procedure for maintaining vehicles were not being followed.

In light of the danger due to fall type incidents, the known danger of safety cable failures and it's adverse effects on vehicle safety, the confusion about when a cable is safe and when a cable should be replaced, the vehicle and in particular the safety cable, needed to be given special design attention to these matters, including:

- a. Testing should have been performed to identify the ability and life of a safety cable in particular when there was no data to support either CCI's or Hanes' position that the cable was safe and proper for its intended use.
- b. Warnings to consumers should have been provided identifying the dangerous period of time when the cable is not safe. Warnings and instructions should have been provided regarding how to properly inspect and maintain the cables. These warnings should have been provided in a manner designed to reach the end-user.
- c. Users should have been provided comprehensible instructions for safe operation and what to do in the event a corroded cable was detected.
- d. Defects in the products should have been designed out.
 - i. The reduced cross sectional area observed in the incident safety cable should have been designed out.
 - ii. The vehicles should have come with instructions for proper use, inspection and maintenance and warnings of the consequences of failures due to improper maintenance.

Allied

- iii. The safety cable should have been designed and manufactured so as not to fail with less than the vehicles expected years of service.
- iv. The safety cable should have been designed and manufactured out of stainless steel due to the corrosive nature of its environment.
- v. The cable coating should have been clear colored rather than yellow so that detecting the presence of rust under the coating would have been possible.

CCI and Hanes breached the standard of care in failing to perform proper pre-market testing with regard to the safety of the vehicle design in particular the safety cable in the event corrosion occurred, the design and construction of the safety cables including warnings or instructions. Adequate pre-market testing would have revealed the following:

- a. The dangers associated with corrosive failures.
- b. The fact that the CCI and Hanes' position that the vehicle was safe for its intended use with the safety cables they both supplied was inherent flawed.
- c. The need for a proper safety cable assembly.
- d. The need for proper warnings and instructions.
- e. That the Hanes warnings and instructions were defective because they did were not directed to operators nor were they proper. This is particularly troublesome in light of the fact that Hanes attributes the cause of the incident to improper maintenance, a procedure Hanes had a duty to supply and did not.
- f. The auto transporter as a vehicle was defective for lack of a proper safety cable to eliminate the danger associated with falling, and a lack of instructions and warnings. Further that the unit was not fail-safe.
- g. That operators needed to be warned with regard to what to do in the event that a damaged or corroded cable was detected.
- h. That proper use of the product was not clear and obvious. Further, it was ambiguous to the untrained user. Particularly to a lay operator with no previous experience with cables or their inspection and maintenance as occurred in this incident.

CCI, who assembled the vehicle with the Hanes safety cables, thus creating a complete vehicle should have recognized the defective conditions created by Hanes and corrected them.

Even in the absence of prior incidents, both CCI and Hanes should have known that by not providing a proper design, instructions or warnings, from an engineering standpoint, it was foreseeable that operators would not be instructed by warnings, instructions, and/or by design on what to do in the event a corroded cable was detected. However, Allied did receive actual notice of the defects and their ill effects and failed to properly correct the defective condition created by CCI and Hanes.

It is the failure of CCI and Hanes to warn, failure to correct its instructions and the design defects on the incident vehicle that set the wheels in motion with regard to the cause of this incident.

Even though CCI and Hanes understood the dangers associated with improper cables and fall events, it is the lack of proper engineering methodology, namely testing, that prevented them from seeing the big picture and affecting the required change necessary to eliminate the defects within their product, and thus prevent incidents like the Ferguson incident.

The manufacturer cannot delegate essential responsibilities for training operators to a user or customer in particular when warnings and instructions are not clear and obvious and for the most part non-existent. Further, proper operation was ambiguous to the untrained user.

E. FINDINGS

Within a reasonable degree of engineering certainty, and subject to change if additional information becomes available, it is my professional opinion that:

1. The Ferguson vehicle was defective.
2. Ferguson's actions were proper and were not a cause of this incident.
3. The Safety Cable failed during normal reasonable operation and caused this crash.
4. The incident vehicle was defective in that the Safety Cable failed during normal reasonable operation.
5. The Safety Cable was defective in that it was not corrosion resistant and failed in an area of reduced cross section in the presence geometric stress concentrations.
6. The incident vehicle was defectively manufactured without a proper Safety Cable, known available technology that should have been utilized in its design.
7. The incident Vehicle was dangerous and defective in a manner that caused Ferguson's fall.
8. Furthermore, in the absence of a proper design, which would prevent falls, warnings and instructions should have been provided with regard to required inspection and maintenance procedures.
9. Hanes' design and manufacture of the incident Safety Cable was improper and caused Ferguson's fall. Further, CCI and Allied's actions were improper in that they failed to correct the defective condition that Hanes created. Further, Allied had prior knowledge of the defective condition, and was responsible for the vehicle's maintenance, and failed to act on the knowledge and correct the defective condition that Hanes created.
10. By not properly maintaining the incident vehicle Allied, reasonably and with substantial certainty, created an unsafe work condition that would and in fact did lead to Ferguson's injuries
11. CCI's responsibility for the configuration of the incident vehicle was as great as that of Hanes as they completed the vehicle and was responsible for it's configuration.

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Gabriel G. Alexander P.E.



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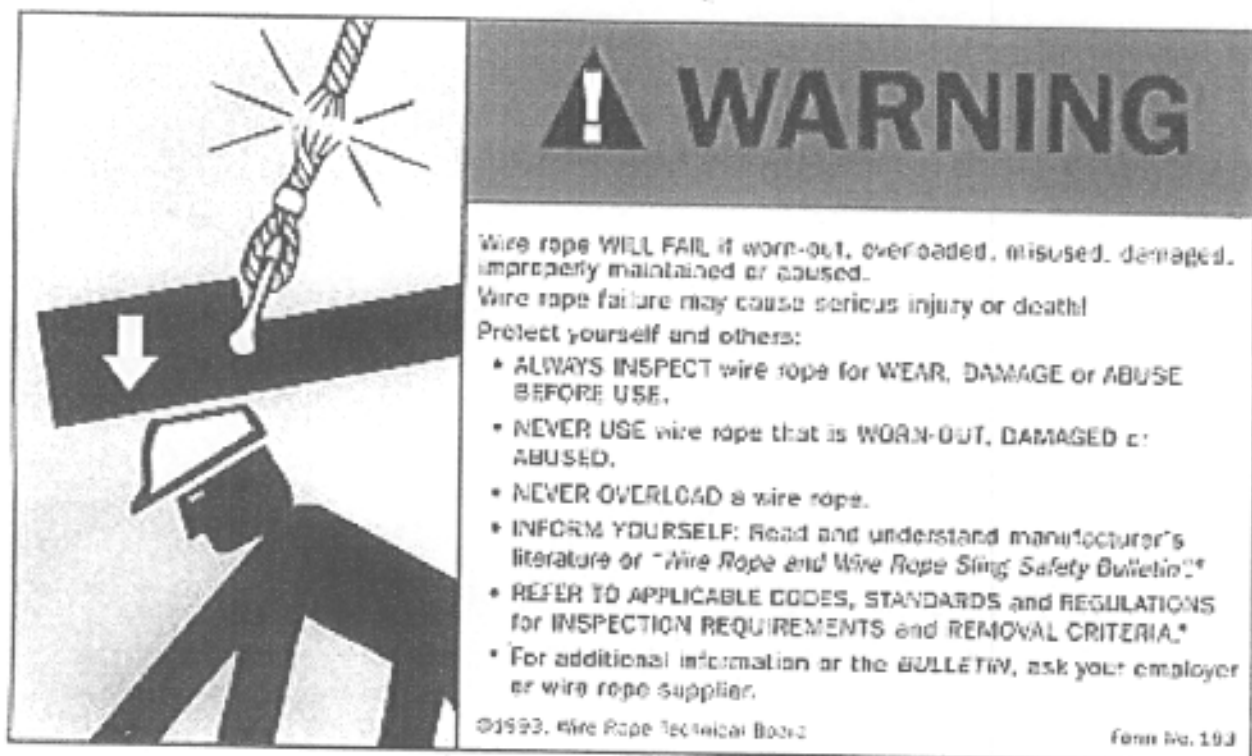
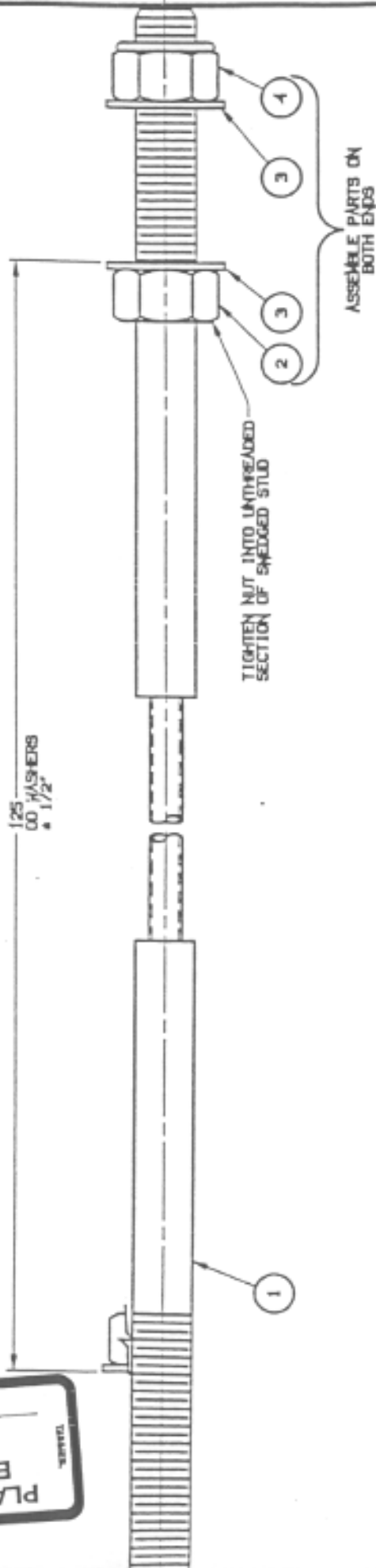


Figure 1

Robson Lapina



CCI PART # 46318

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Attachment A